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# EG&G ROCKY FLATS

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September 13 1991

91 RF 5878

Robert M Nelson Jr  
Manager  
DOE RFO

Attn F R Lockhart

IAG DELIVERABLE FINAL WORK PLAN FOR CONTROL OF RADIONUCLIDE LEVELS IN WATER  
DISCHARGES FROM THE ROCKY FLATS PLANT SEPTEMBER 1991 JMK 0601 91

As required by the Interagency Agreement (IAG) we are enclosing two copies of the Final  
Work Plan for Control of Radionuclide Levels in Water Discharges from the Rocky Flats  
Plant September 1991 This deliverable meets with the IAG scheduling of  
September 16 1991 The Work Plan incorporates the July 1991 comments from the  
Department of Energy (DOE) the Environmental Protection Agency (EPA) and the Colorado  
Department of Health (CDH)

Due to short time constraints the Document Review Comment Record of EPA and CDH  
Comments will follow at a later date

If you have any questions please feel free to contact T C Greengard at extension 7121 or  
J T Ottensman at extension 3198 of Remediation Programs The milestone date for the  
Work Plan is September 16 1991 to EPA and CDH

*[Signature]*  
J M Kersh Associate General Manager  
Environmental and Waste Management

JTO dmf

Attachments  
As Stated

cc  
T T Olsen DOE RFO  
R J Schassburger DOE RFO

DIST	MC
BRETZKE, J C	
BURLINGAME, A H	
COPP, R D	
CROUCHER, D W	
DAVIS J G	
EVERED J E	X
FERRERA D W	
FERRIS L R	
FRAIKOR, F J	
FRANCIS, G E	X
GODWIN, R	
HEALY, T J	
IDEFER, E H	
JENS, J P	
KEELE, P B	
KERSH, J M	X
KIRBY W A	
KIRKEBO, J A	
LEE, E M	X
MAJESTIC, J R	
MATHEWS, J A	
MEURRENS, B E	
MORGAN, R V	X
NORTH, P	
PALMER, L A	
POTTER, G L	X
PIZZUTO, V M	
RHOADES, J I	X
SAFFELL, B F	
SWANSON, E R	
WIEBE, J S	
WILKINSON, R B	X
WILLIAMS, R E	
WILSON, J M	
YOUNG, E R	
ZANE, J O	
Greengard, T C	X
Jemison, B A	X
Sunge, P S	X
Ottensman, J T	X
K Tter, J P	X

W M Tracking X  
CORRESPONDENCE  
TRAFFIC

CLASSIFICATION  
UCNI  
UNCLASSIFIED X X  
CONFIDENTIAL  
SECRET

AUTHORIZED CLASSIFIER  
SIGNATURE

DATE 9-10-91

IN REPLY TO LTR NO

IC#  
TR APPROVALS  
JEE JPK  
PSB  
ORIG & TYPIST INITIALS  
TTO / J - E

ADMIN RECORD

A-0005-0000373

## Executive Summary

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This Workplan prepared in response to Section XII of the Interagency Agreement (IAG) dated January 22 1991 and review comments by EPA and Colorado Department of Health (CDH) dated July 3 and July 15 1991 addresses the *control of water discharges from Rocky Flats holding/detention ponds*. The Workplan describes analytical protocol methods and limitations for determining radionuclide levels summarizes statistical assessments of accumulated analytical results and presents recommendations for additional radionuclide studies to better characterize the water quality of RFP discharges. The Workplan also describes current approaches for planning approving and conducting offsite discharges of water from the RFP terminal ponds (A-4 B 5 and C 2). Approaches for implementing discharge are reviewed and methods for streamlining operations are proposed. Current treatment approaches and limitations are reviewed and plans for future treatability studies are addressed.

Surface water impacted by Rocky Flats Plant (RFP) flows in three major drainages where it is directed into a series of downstream holding ponds. Offsite discharges of water are made from the terminal Ponds A 4 B 5 and C 2 in these drainages. The ponds provide storm water runoff collection and control as well as capacity for detention of water contaminated by accidental spills and potentially requiring treatment prior to release. Accumulated water is detained so that adequate water quality analyses can be performed. The ponds are intended to be operated at 10 percent of capacity to provide surge protection in the event of storms or accidental spills and thus afford the collection and treatment options. Ponds are designed for operation in the normally near empty condition to provide maximum holding capacity for accidental waterborne contaminant releases. When ponds are maintained in a near full condition minimal spill containment and storm water runoff capacities are available and saturation and weakening of the containment structures (originally intended for short term or low volume storage) occurs. Timely release of water is therefore necessary to comply with the NPDES discharge permit and to ensure dam safety.

At present seven discharge points are allowed for RFP surface water by the National Pollutant Discharge Elimination System (NPDES) permit for the site. This site NPDES permit has been modified in part by the Federal Facilities Compliance Agreement.

(FFCA) with regard to the Sewage Treatment Plant (STP) although these modifications do not include additional requirements for monitoring radiological parameters

Additional surface water quality classifications and stream standards were established for RFP waters by the Colorado Water Quality Control Commission (CWQCC) Per the cooperative Agreement in Principle (AIP) the U S Department of Energy (DOE) and the State of Colorado agree (1) to perform joint monitoring of RFP waters to assure water quality and (2) to confer regarding the safety of and any requirements for offsite water discharges

Sampling (including split sampling) of waters prior to discharge is routinely conducted and the results are shared monthly with regulatory authorities and affected municipalities Safety of discharges is established through the sampling program and subsequent releases of water are conducted in accordance with additional requirements such as biomonitoring and under the auspices of CDH However several problems arise as a result of this operational mode and include delays in obtaining permission to begin or resume discharge in a timely and straightforward manner

Currently available analytical methods do not allow real time monitoring of radionuclides because (1) the chemical separations are intricate and time consuming and (2) analytical counting times are lengthy Analytical precision and accuracy are improved by extending counting times and/or increasing sample volumes but the limitations of current technology do not allow substantial improvement in analytical turnaround times Currently analytical turnaround times of 61 days for offsite facilities are typical these turnarounds complicate and confound the operational management of routine releases of water (of known quality) Measured values approach the lower limit of detection for radiometric methods This limitation to real time knowledge of water quality complicates decisions to initiate or resume discharge of impounded water

Following sampling and prior to CDH concurrence water is recirculated (returned to the source pond) until authorization is received to initiate discharge During the approval period the open ponds are subject to potential contamination by runoff from precipitation events and windborne deposition while analyses are being determined Temporary water treatment systems are now in place at the point of final discharge

Treatment currently consists of sequential particulate filtration and granular activated carbon (GAC) adsorption unit operations. Work is underway to consolidate, refine, and improve the effectiveness of treatment. For reasons of space limitations and economy, future treatment will be centralized at Pond A-4. This consolidation will be accomplished with the aid of water transfers between ponds.

The Workplan describes past and proposed approaches for planning, approving, and conducting offsite water discharges from the RFP terminal ponds. Discharge management is also strongly affected by analytical, statistical, and water treatment issues. Analytical constraint of the methods employed to determine radionuclide concentrations is below minimum detectable activity (MDA) and is also subject to intrinsic variability. The response in this Workplan is both to refine understanding of the limitations of analytical techniques and also to refine statistical understanding and interpretation of analytical values.

As to the former analytical methods applicable to the specified radionuclides, are proposed for approval in this Workplan based on (1) analytical precision and (2) robustness of the analytical method—its sensitivity to upset and interferences. As to the latter, further statistical study is proposed in the Workplan to isolate long-term and seasonal trends, to identify methods of determining outliers, to enhance definition and characterization of statistical distribution of the data, and associated variability. Evaluations of available data are presented as preamble to illustrate the status of present understanding in this regard.

A third consequence of analytical and statistical shortcomings is evidenced in some of the treatability work to date, namely the unexpected performance of the filters which pre-treat flows to the granular activated carbon (GAC) units. The response incorporated into this Workplan is to improve characterization of the radionuclides, enhance present treatment system capability, then consider bench- and pilot-scale treatment using technology (1) now promulgated for BAT for removal of radionuclides under the Safe Water Drinking Act (SWDA), (2) scheduled for implementation as high priority interim measures (IM/IRAs) and RFP Operable Units (OUs), and (3) planned for the Sitewide Treatability Study Program. Technologies that will be considered include adsorption, precipitation, enhanced sedimentation, improved filtration, ion exchange, and membrane separation.